

ABSTRACT

The formation of shallow trench isolations in a strained silicon MOSFET includes performing ion implantation in the strained silicon layer in the regions to be etched to form the trenches of the shallow trench isolations. The dosage of the implanted ions and the energy of implantation are chosen so as to damage the crystal lattice of the strained silicon throughout the thickness of the strained silicon layer in the shallow trench isolation regions to such a degree that the etch rate of the strained silicon in those regions is increased to approximately the same as or greater than the etch rate of the underlying undamaged silicon germanium. Subsequent etching yields trenches with significantly reduced or eliminated undercutting of the silicon germanium relative to the strained silicon. This in turn substantially prevents the formation of fully depleted silicon on insulator regions under the ends of the gate, thus improving the MOSFET leakage current.